

Application No. 09/905,051  
Reply to Office Action of August 10, 2005

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-3 (Canceled).

Claim 4 (Currently Amended): A video signal coding method comprising the steps of:

determining a coding difficulty level  $d$  of an input video signal for each unit of time;  
measuring visual characteristics of the input video signal;  
determining a reference value for allocating coding bits on the basis of temporally  $b(d)$  for the amount of coding bits  $b$  allocated for each unit of time and related in advance to the coding difficulty level  $d$  of said input video signal for each unit of time;

determining an actual amount of allocated coding bits  $b_x$  on the basis of the reference value, and

generating coded data by coding the input video signal for each unit of time on the basis of said actual amount of allocated coding bits  $b_x$ , wherein part of the sum  $B_{av}$  of the amounts of allocated bits  $b_{av}$  per unit time for a certain period of time  $T_{vbr}$ , or

$$B_{av} = b_{av} \cdot T_{vbr} \quad B_{av} = b_{av} \times T_{vbr},$$

is stored as virtual buffer  $V_{vbr}$  in advance and the actual reference value of the amount of allocated coding bits  $b_{real}$  is obtained by

$$b_{real} = (B_{av} - V_{vbr}) / T_{vbr}$$

so that an amount of allocated bits not smaller than  $b_{real}$  is given as long as  $V_{vbr} > 0$  but an amount smaller than  $b_{real}$  is given otherwise in said step of determining the actual amount of allocated coding bits on the basis of said reference value.

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Claim 5 (Original): The video signal coding method according to claim 4, wherein an upper limit is provided in advance according to the amount of allocated bits  $b_{av}$  when giving an amount of allocated bits exceeding said  $b_{real}$ .

Claim 6 (Original): The video signal coding method according to claim 4, wherein a lower limit is provided in advance according to the amount of allocated bits  $b_{av}$  when giving an amount of allocated bits smaller than said  $b_{real}$ .

Claim 7 (Original): The video signal coding method according to claim 4, wherein the upper limit is provided according to a proportion of scenes that are conspicuously degraded as a result of coding by taking the visual characteristics of the input image into consideration when giving an amount of allocated bits smaller than said  $b_{real}$ .

Claim 8 (Original): The video signal coding method according to claim 4, wherein, when the difference between the sum of the amounts of actually generated bits  $B_{gen}$  in the period of time and the sum of the amounts of available bits  $B_{av}$  in the period of time ( $B_{av} - B_{gen}$ ) is positive when the coding operation in said period of time  $T_{vbr}$  is over, the difference is carried over and added to the sum of the amounts of available bits in the next period of time.

Claim 9 (Original): The video signal coding method according to claim 4, wherein, when the sum of the amounts of available bits exceeds  $R_{total}$  times of the initial sum  $B_{av}$  as a result of carrying over the difference, the reference value of the actually allocated bits per unit time  $b_{real}$  is raised according to the ratio.

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Claims 10-11 (Canceled).

Claim 12 ((Previously Presented): A video signal encoder comprising:  
a means for determining a coding difficulty level  $d$  of an input video signal for each unit of time;  
a means for measuring visual characteristics of the input video signal;  
a means for determining a reference value for allocating coding bits on the basis of temporally  $b(d)$  for the amount of coding bits  $b$  allocated for each unit of time and related in advance to the coding difficulty level  $d$  of said input video signal for each unit of time;  
a means for determining an actual amount of allocated coding bits  $b_x$  on the basis of the reference value; and  
a means for generating coded data by coding the input video signal for each unit of time on the basis of said actual amount of allocated coding bits  $b_x$ , wherein said means for determining the actual amount coding bits on the basis of the reference value controls the actual amount of allocated bits in such a way that the sum of the generated bits obtained when coding the input video signal for a certain period of time  $T_{vbr}$  does not exceed the amount of bits available for recording a signal having the length of the period of time  $T_{vbr}$  on a recording medium.

Claim 13 (Currently Amended): A video signal encoder comprising:  
a means for determining a coding difficulty level  $d$  of an input video signal for each unit of time;  
a means for measuring visual characteristics of the input video signal;

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a means for determining a reference value for allocating coding bits on the basis of temporally b(d) for the amount of coding bits b allocated for each unit of time and related in advance to the coding difficulty level d of said input video signal for each unit of time;

a means for determining an actual amount of allocated coding bits b\_x on the basis of the reference value; and

a means for generating coded data by coding the input video signal for each unit of time on the basis of said actual amount of allocated coding bits b\_x, wherein part of the sum B\_av of the amounts of allocated bits b\_av per unit time for a certain period of time T\_vbr, or

$$B_{av} = b_{av} \times T_{vbr} \quad B_{av} = b_{av} \times T_{vbr},$$

is stored as virtual buffer V\_vbr in advance and the actual reference value of the amount of allocated coding bits b\_real is obtained by

$$b_{real} = (B_{av} - V_{vbr}) / T_{vbr}$$

so that an amount of allocated bits not smaller than b\_real is given as long as V\_vbr > 0 but an amount smaller than b\_real is given otherwise in said step of determining the actual amount of allocated coding bits on the basis of said reference value.

Claim 14 (Original): The video signal encoder according to claim 13, wherein an upper limit is provided in advance according to the amount of allocated bits b\_av when giving an amount of allocated bits exceeding said b\_real.

Claim 15 (Original): The video signal encoder according to claim 13, wherein a lower limit is provided in advance according to the amount of allocated bits b\_av when giving an amount of allocated bits smaller than said b\_real.

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Claim 16 (Original): The video signal encoder according to claim 13, wherein the lower limit is determined as according to a proportion of scenes that are conspicuously degraded as a result of coding by taking the visual characteristics of the input image into consideration when giving an amount of allocated bits smaller than said  $b_{\text{real}}$ .

Claim 17 (Original): The video signal encoder according to claim 13, wherein, when the difference between the sum of the amounts of actually generated bits  $B_{\text{gen}}$  in the period of time and the sum of the amounts of available bits  $B_{\text{av}}$  in the period of time ( $B_{\text{av}} - B_{\text{gen}}$ ) is positive when the coding operation in said period of time  $T_{\text{vbr}}$  is over, the difference is carried over and added to the sum of the amounts of available bits in the next period of time.

Claim 18 (Original): The video signal encoder according to claim 13, wherein, when the sum of the amounts of available bits exceeds  $R_{\text{total}}$  times of the initial sum  $B_{\text{av}}$  as a result of carrying over the difference, the reference value of the actually allocated bits per unit time  $b_{\text{real}}$  is raised according to the ratio.

Claim 19 (Previously Presented): A video signal coding method comprising the steps of:

utilizing a virtual buffer;  
allocating an amount of information greater than  $b_{\text{real}}$  to an image showing a relatively high coding difficulty level, where  $b_{\text{real}}$  is obtained by  
$$b_{\text{real}} = (B_{\text{av}}) \times (R_{\text{vbr}}); \text{ and}$$
controlling a bit rate based on an amount of residue, where the amount of residual is obtained by

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$(b_{\text{real}} - b_{\text{av}})x(T_{\text{vbr}});$

wherein an amount of information smaller than  $b_{\text{real}}$  is allocated to an image showing a relatively low coding difficulty level.